Part 2 Adaptive A\* Question

Compare Repeated Forward A\* and Adaptive A\* with respect to the number of states they expand. You should compare the number of expansions that both algorithms perform during their first search, the number of expansions during their second search, and the average number of expansions over all searches until the target is reached. Explain your observations in detail, that is, explain what you observed and provide a reason for your observations.

Repeated Forward A\*: Adaptive A\*

First search: 153 First search: 153

Second search: 153 Second search: 145

Steps: 140 Steps: 140

Total expansions: 12607 Total expansions: 7346

Average expansions: 90 Average expansions: 52

From the results above, it is evident that Adaptive A\* focuses much greatly on nodes further away from the start node, and therefore needs significantly fewer average expansions to find the goal node. However, since both algorithms are optimal, the number of steps it takes for both is the same.

This is evident by the difference in expansions between the first and second searches. Repeated Forward A\* maintains a 153 number of expansions for the first two searches, since H values are constant (using Manhattan Distance). However, since Adaptive A\* updates the H value to the heuristic H = G(Goal node) – G(expanded node), it results in a more focused search and therefore fewer expansions;